

CLAIMS

1. A liquid injection system for an environmental scanning electron microscope, the liquid injection system comprising:
5 a liquid firing device for firing a liquid; and,
a heat transfer system for maintaining the liquid below its boiling point at an operating pressure within the specimen chamber of the environmental scanning electron microscope.
- 10 2. A liquid injection system according to claim 1, in which the liquid firing device is an inkjet print head.
3. A liquid injection system according to claim 1, in which the liquid firing device comprises a liquid reservoir.
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4. A liquid injection system according to claim 1, comprising a liquid firing mechanism, the liquid firing mechanism being either a piezo electric firing system or a thermal firing system.
- 20 5. A liquid injection system according to claim 3, in which heat transfer system comprises a first heat sink arranged at least partially within the liquid reservoir; and, a thermoelectric module which when in use has a cold side and a hot side, the cold side of which is in communication with the first heat sink.
- 25 6. A liquid injection system according to claim 5, in which the heat transfer system comprises a second heat sink in communication with the hot side of the thermoelectric module.
- 30 7. A liquid injection system according to claim 6, in which the heat transfer system further comprises a fan to generate a gas flow to transfer heat from the second heat sink to the surrounding atmosphere.

8. A liquid injection system according to claim 6, in which the heat transfer system comprises a conductive heat transfer unit in communication with the thermoelectric module.

5 9. A liquid injection system according to claim 8, in which the conductive heat transfer unit is in communication with the thermoelectric module via elements of the second heat sink.

10 10. A liquid injection system according to claim 8, in which the conductive heat transfer unit is a member made of a conductive material the member being routed within the specimen chamber to contact the second heat sink to enable conduction of heat from the second heat sink to the member.

15 11. A liquid injection system according to claim 8, in which the member is a metal pipe having a current of liquid running therethrough such that as liquid passes through said pipe, it is warmed by heat received from the second heat sink.

20 12. A liquid injection system according to claim 1, in which the liquid is selected from the group consisting of ink, water, oil or a suspension or solution comprising one or more of ink, water and oil.

13. An environmental scanning electron microscope, comprising:
an electron source to provide a beam of electrons;
a specimen chamber for receiving a specimen to be viewed by the microscope; and,
25 a liquid injection system according to claim 1, the liquid injection system being controllable within the specimen chamber to fire liquid onto the specimen whilst the specimen is being viewed.

30 14. A method of firing a liquid firing device in an environmental scanning electron microscope, comprising the steps of;
providing a liquid injection system according to claim 1 in the specimen chamber of the environmental scanning electron microscope;

monitoring the temperature of liquid in an associated liquid reservoir within the liquid firing device;

adjusting the temperature of the liquid to maintain the temperature of the liquid below its boiling point at an operating pressure within the specimen chamber of the

5 environmental scanning electron microscope.

15. A method according to claim 14, in which the temperature of the liquid is adjusted automatically, in dependence on a control signal obtained from the liquid reservoir the signal being indicative of the temperature of the liquid.